

# Light and Lighting

Vol. XLI.—No. 9

September, 1948

Price: One Shilling



**FIRST PARACHUTE DESCENT IN ENGLAND.** *The first parachute descent was made in London by M. Garnerin, on September 21, 1802. He ascended from Grosvenor Square and landed safely in a field near St. Pancras Church.*

## ANOTHER "FIRST"

The Lighting Service Bureau was the first institution of its kind. Established by the Electric Lamp Manufacturers' Association in 1924, it is today widely recognised as the most reliable source of lighting information.

# Why Electric Street Lighting Conserves National Resources and Cuts Local Rates

## 1. NATIONAL ECONOMY

For a given standard of lighting, electrification *reduces* coal used by 80%. Thus, if the lighting standard of a road is improved 100% when electrified, the coal burned to provide the electricity is only 40% of previous requirements.

## 2. LOCAL RATES

Electric Street Lighting keeps local costs down, gives the highest grade of lighting and best appearance for a given annual expenditure.

## 3. EFFICIENCY

Electric Street lanterns make fullest use of available light, are easily cleaned, and in permanent adjustment.

## 4. CONTROL

Electric Street Lighting can be controlled effectively and cheaply from one or more central points, by time-switch, by photo-electric cell, by push-button or by combining these methods.

## PROGRESS

From the Jablochhoff Candle, the Magazine Arc, the Carbon, Tantalum, and Tungsten Vacuum Lamps to the Gas-Filled Coiled-Coil Lamp; and from the Mercury and Sodium Discharge Lamps to the tubular Fluorescent Lamp of today, Electric Street Lighting has progressed to become the most economical and efficient in existence today.

# ELECTRICITY

*for economical street lighting*

BRITISH ELECTRICAL DEVELOPMENT ASSOCIATION, 2, SAVOY HILL, LONDON, W.C.2

# Light and Lighting

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London, S.W.1.

Telephone :  
ABBoY 5215

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## J. S. DOW

TO Mr. J. S. Dow, whose death occurred unexpectedly on August 12, the cultural, or educational purpose of the I.E.S. was its principal *raison d'être*. But the dissemination of information about lighting practice and the promotion of good lighting was, Mr. Dow believed, something that could be furthered by a Journal which, unlike the *Transactions* of the Society, would provide a medium for the publication of "popular" technical articles as well as of accounts of new installations and other matter concerning light and lighting which could not well be included in the formal *Transactions* of the Society. He edited the Journal for twenty years and "saw it through" the difficult years of war which might have tempted a less enthusiastic Editor to suspend publication. It was his desire to enhance the value of the Journal steadily, and to make it appeal to a wider public; here then is the goal towards which his successor should strive.

# Illumination

## Notes and News

### The Science of Seeing

During a short visit to this country after the I.C.I. meeting in Paris, Dr. Mathew Luckiesh gave two lectures on the work in connection with lighting and vision which he has carried out in the U.S.A. over the last 30 years or so. The first lecture was arranged by the Association of Optical Practitioners and was given at the London School of Hygiene and Tropical Medicine on July 14. The second lecture was arranged by the Lighting Service Bureau on July 16.

During his lectures Dr. Luckiesh stressed that the eye and lighting are only the tools which are used in the science of seeing. Lighting engineers, he said, gave much attention to their lighting equipment and apparatus, and the optical profession studied the operation of the eye. It was necessary, however, for the lighting engineer to give far more thought to the process of seeing, if he was to make the best use of his powers.

Opticians, he said, usually test the eyesight of patients by getting them to read black lettering on a white background, the card being lighted to perhaps 10 ft.-candles. A patient

passing such a test is said to have normal vision. Nevertheless, the subject's vision may still not be good enough for his everyday work, the majority of visual tasks being carried out under conditions of much less favourable contrast than the eyesight test. Garment workers, for instance, may be working with black thread on black cloth, offering very little contrast, and for practical purposes their eyes should be tested under conditions comparable with their work. It would then be found that, instead of being satisfied with 10 ft.-candles, they would require 500 or more.

This, said Dr. Luckiesh, shows how misleading the use of the foot-candle can be. It is not the illumination that matters but the brightness. He said he would like to

see the use of the term "foot-candle" abolished and the "foot-lambert" used instead.

He quoted the results of some tests which had been carried out over a period of two years on a group of office machine operators in the U.S.A., and which showed that improved lighting resulted in improved performance. The improvement in results was not immediate, but came

### Next I.E.S. Meeting in London

The opening meeting of the new session will be held in the Hall of the Royal Society of Arts, John Adam-street, London, W.C.2, at 6 p.m. on Tuesday, October 12.

At this meeting the incoming President, Mr. J. M. Waldram, will be introduced and will present his *Presidential Address*. Mr. Waldram, who is a Fellow of the Society, is a senior research illuminating engineer at the research laboratories of the General Electric Company. He has been a member of the society for 25 years, during which time he has contributed a number of papers.

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gradually over a few months, though the most marked improvement was found after the workers had had their annual holidays. This indicated that perhaps workers get into a groove, out of which they will only be moved after a complete break from the work. The results of these tests also showed that a greater improvement in performance was found with subjects who had bad eyesight than with those who had good eyesight, i.e., the improved lighting gave the greatest help where it was most needed. Spectacles are invaluable, but after they had corrected the eyesight further improvements in visual acuity could be obtained by improving the lighting.

Dr. Luckiesh also discussed the various type faces used in printed matter. Apart from the difference in legibility of the different types, ease of reading could also be effected by the quality of the paper used. Cheap books, and, in particular, children's books, were often printed on bad and sometimes coloured paper which offered little contrast with the black type.

### ***I.E.S. Sheffield Centre***

Before the war it was the custom of the Sheffield Centre to begin the session with an informal lunch. This practice had to be dropped during the war years, but we are glad to hear that it is to be revived this year.

Arrangements have been made for the luncheon, which is open to I.E.S. members and their wives, to be held at the Grand Hotel, Sheffield, at 12.30 p.m. on Monday, October 4. The occasion will not only mark the opening of the new session, but also the installation of the new centre chairman, Mr. B. Bingham.

Events such as this arranged by I.E.S. centres are invariably most successful, and coming at the beginning of the session are most useful in getting members together again after the summer recess.

### ***I.E.S. Meetings***

With the beginning in October of the new I.E.S. session, we once again give, on pages 185-6 of this issue, a summary of I.E.S. meetings, etc., to take place during the next few weeks. The full programme for the session is published in the I.E.S. TRANSACTIONS as usual.

No doubt we shall soon be receiving sufficient information to enable us to report on I.E.S. centres activities in these columns. We are anxious to give due publicity to the work of the centres and groups but in the past the necessary information has seldom been available. It has already been suggested that where they have not already done so centres might appoint a "Press officer," whose duty it would be to report meetings not only for us but for the local Press and other publications. Such reports should not attempt to summarise the meeting in a few words, but rather should pick on the salient points of the lecture which would be of interest to our readers.

Amongst the members of the I.E.S. there are also a number of enthusiastic photographers but it is very seldom that we receive pictures taken at meetings or other events. There must be frequent opportunities for members to make pictorial records of I.E.S. events. In this connection it might be mentioned that though a prize of two guineas was offered for the best photograph taken by an I.E.S. member at Harrogate during the recent Summer Meeting, the response was very poor, only two entries being submitted, both unfortunately too late for publication.

Whilst on the subject of I.E.S. meetings it might be mentioned that visits included in the London programme are open to all members of the Society whether they are located in London or not. Applications for places should be made early as numbers are usually restricted.

## Courses in Illuminating Engineering

Since the note on courses which appeared on p. 176 of the last issue of the journal was prepared, details of other courses have been received.

Arrangements have been made by the Manchester College of Technology to hold a further course similar to that held last year for the Inter. C. and G. examination. Full details may be obtained either from the Principal of the college or from Mr. W. E. Ballard (hon. sec. of the Manchester I.E.S. centre), Fair Rigg, Fairview-road, Timperley, Cheshire.

It is understood that Mr. F. M. Hale is to continue the good work he has been doing over the last few years at the Stow College School of Engineering, Glasgow, though there is some doubt at the moment whether the course beginning in September will be for the Inter. or Final C. and G. Exam. Those interested should contact Mr. F. M. Hale, Glasgow Corporation Lighting Dept., 20, Tron-gate, Glasgow.

Those who are unable to take advantage of the many courses which are now offered may like to be reminded that correspondence courses for both the Inter. and Final Grades of the C. and G. are arranged by the British Institute of Engineering Technology (17-19, Stratford-place, London, W.1).

## American I.E.S. Conference

The annual National Technical Conference of the American I.E.S. was held at Boston from September 20 to 24. The programme of technical papers covered a very wide field, and included papers on the life and maintenance of fluorescent lamps, lighting at the New York Airport, the design of louvres and louverall lighting systems, critical seeing and many other subjects.

The programme also included the

presentation of reports on the work of the 50 or so technical committees who are looking into such matters as the lighting of libraries, schools, etc., or in special industries.

Our American colleagues also seem to be giving more attention to lighting in the home than we in this country have done in the past. In one afternoon no less than five papers on this subject were given and additional papers dealing with different aspects of home lighting were included in other parts of the programme.

## I.E.S. Visit to Southampton Docks

An attractive programme is being arranged for the visit of the I.E.S. to Southampton Docks on November 23. The party will leave Waterloo Station at 9.30 a.m., and before lunch will visit a pumping station at the King George V. Graving Dock. After lunch a brief tour will be made of the docks, when it may be possible for the party to visit one of the larger liners. Tea will be taken on the S.S. "Falaise," which will be followed by an inspection of the quayside lighting. The party will arrive back at Waterloo Station between 8 and 9 p.m.

Arrangements have been made for the party to travel by rail at special rate. To cover rail fare, lunch and transport within the dock area a charge of £1 2s. 6d. will be made for this visit.

This visit is likely to be a most popular one and I.E.S. members wishing to take part should communicate with the Secretary of the Illuminating Engineering Society, 32, Victoria-street, London, S.W.1, as soon as possible, enclosing a cheque to cover the cost of the number of tickets they require.

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## Forthcoming I.E.S. Meetings

### (Provisional List)

#### LONDON

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Oct. 12th. **Sessional Meeting.** Mr. J. M. WALDRAM, **Presidential Address.** (At the Royal Society of Arts, John Adam Street, W.C.2.) 6 p.m.

Oct. 21st. **Visit to the Research Laboratories of the British Thomson-Houston Co., Ltd., Rugby.** (Party will leave Euston Station at 10.50 a.m.) (Admission by ticket only.)

Nov. 9th. **Sessional Meeting.** Dr. J. W. MITCHELL on **High Speed Photography.** (At the Lighting Service Bureau, 2, Savoy Hill, W.C.2.) 6 p.m.

Nov. 23rd. **Visit to Southampton Docks.** (Party will leave Waterloo Station at 9.30 a.m.) (Ticket only.)

#### CENTRES AND GROUPS

1948.

Sept. 9th. Mr. L. F. A. DRISCOLL on **Lighting of Docks and Railways.** (At the South Wales Institute of Engineers, Park Place, Cardiff.) 5.45 p.m.

Sept. 30th. **Ladies' Night.** (Dinner Dance.) (At the Crown and Cushion Hotel, Perry Barr, Birmingham.)

Sept. 30th. **Address by the Chairman** (Mr. D. ROSS). (At the Institution of Engineers and Shipbuilders in Scotland, 39, Elmbank Crescent, Glasgow, C.2.) 6.0 p.m.

Sept. 30th. Mr. W. A. R. STOYLE on **Operation and Maintenance of Fluorescent Tubes.** (At the Bradford No. 1 Sub Area Office of the Yorkshire Electricity Board, 45-53, Sunbridge Road, Bradford.) 7.30 p.m.

Sept. 30th. Mr. T. CATTEN on **Ship Lighting with special reference to s.s. Caronia.** (At Exeter.)

Oct. 1st. Mr. T. CATTEN on **Ship Lighting, with special reference to s.s. Caronia.** (At the Grand Hotel, Bristol.)

Oct. 1st. Mr. H. R. RUFF on **Rainbow Magic.** (Joint Meeting with the E.A.W.) (At the Nottingham Gas Dept. Demonstration Theatre, Parliament Street, Nottingham.) 5.30 p.m.

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Oct. 4th. Mr. T. CATTEN on **Lighting in the s.s. Caronia.** (At the Medical Library, The University, Western Bank, Sheffield.) 6 p.m.

Oct. 5th. **Address by the Chairman** (Mr. O. C. WAYGOOD). (At the Lecture Theatre, Electricity Showroom, Whitechapel, Liverpool, 1.) 6.0 p.m.

Oct. 6th. **Address by the Chairman** (Mr. H. L. JAMES). (At the Minor Durrant Hall, Oxford Street, Newcastle-upon-Tyne.) 6.15 p.m.

Oct. 7th. Mr. M. W. PEIRCE and Mr. D. J. REED on **General and Specialised Hospital Lighting.** (At the South Wales Institute of Engineers, Park Place, Cardiff.) 5.45 p.m.

Oct. 8th. **Address by the Chairman** (Dr. J. H. NELSON). (At the Imperial Hotel, Temple Street, Birmingham.) 6 p.m.

Oct. 8th. **Dinner and Dance.** (At the Royal Hotel, Cardiff.) 6.30 p.m.

Oct. 8th. Mr. L. C. RETTIG on **Lighting and Safety in Factories.** (At the Electricity Showroom, Market Street, Huddersfield.) 7.15 p.m.

Oct. 11th. **Address by the Chairman** (Mr. J. D. GREEN). (At the No. 4 Sub Area Office, Yorkshire Electricity Board, Whitehall Road, Leeds, 1.) 6 p.m.

Oct. 14th. Mr. HOWARD LONG on **Light and Sight.** (At Leicester.)

Oct. 14th. **Luncheon Meeting and Presidential Address** by Mr. J. M. WALDRAM. (At the Midland Hotel, Manchester.) 12.30 p.m.

Oct. 14th. Mr. W. J. WELLWOOD FERGUSON on **Colour.** (Joint Meeting with the British Optical Association.) (At the Reynolds Hall, Manchester College of Technology, Sackville Street, Manchester.) 6 p.m.

Oct. 28th. Mr. A. W. JERVIS on **Problems Associated with the Lighting of Departmental Stores.** (At the Institution of Engineers and Shipbuilders in Scotland, 39, Elmbank Crescent, Glasgow, C.2.) 6.0 p.m.

Oct. 28th. Mr. P. H. HARRIS on **School Lighting.** (At the Bradford No. 1 Sub Area Office, Yorkshire Electricity Board, 45-53, Sunbridge Road, Bradford.) 7.30 p.m.

(Secretaries of Centres and Groups are requested to send in particulars of any changes in programmes, mentioning subject, author, place, date and time of meeting: summaries of proceedings at meetings (which should not exceed about 250-500 words) and any other local news are also welcome.)

1948.

**Oct. 29th.** MR. A. W. JERVIS on Problems Associated with the Lighting of Departmental Stores. (At the Heriot-Watt College, Chambers Street, Edinburgh.) 6.30 p.m.

**Nov. 1st.** MR. W. T. SOUTER on Church Lighting. (At the Medical Library, The University, Western Bank, Sheffield, 10. 6 p.m.)

**Nov. 2nd.** PROF. M. G. SAY on Stage Illumination. (Joint Meeting with the British Drama League.) (At the Lecture Theatre, British Electrical Authority's Showroom, Whitechapel, Liverpool, 1.) 6.30 p.m.

**Nov. 3rd.** MR. G. GRENFELL BAINES on Illumination of Architecture. (At the Minor Durant Hall, Oxford Street, Newcastle upon Tyne.) 6.15 p.m.

**Nov. 4th.** A discussion on Lighting in the Home—The Future Plan. (Joint meeting with the Newport Branch of the E.A.W. and the Newport Townswomen's Guild.) (At the Newport Town Hall Assembly Room.) 3 p.m.

**Nov. 4th.** MR. J. M. WALDRAM, Presidential Address. (At Leicester.)

**Nov. 4th.** MR. J. ASSERSOHN, MR. L. GARDINER, MR. H. WILSON on Decorative Design. (At Exeter.)

**Nov. 5th.** MR. J. ASSERSOHN, MR. L. GARDINER, MR. H. WILSON on Decorative Design. (At the South Western Electricity Board, Old Bridge, Bath.)

**Nov. 5th.** Exhibition of Lighting Equipment. (At the Midland Electricity Board's Lecture Theatre, Paradise Street, Birmingham.) 6 p.m.

**Nov. 5th.** MR. W. A. ALLEN on Glare and Natural Lighting. (At the Electricity Showroom, Market Street, Huddersfield.) 7.15 p.m.

**Nov. 5th.** MR. J. M. WALDRAM, Presidential Address. (At the Nottingham Gas Dept. Demonstration Theatre, Parliament Street, Nottingham.) 5.30 p.m.

**Nov. 8th.** MR. T. CATTEN on Lighting of the R.M.S. Queen Elizabeth and the s.s. Caronia. (At the No. 4 Sub Area Office, Yorkshire Electricity Board, Whitehall Road, Leeds, 1.) 6 p.m.

**Nov. 11th.** MR. W. D. SINCLAIR on Fluorescent Street Lighting. (Joint meeting with the A.P.L.E.) (At the Reynolds Hall, Manchester College of Technology, Sachville Street, Manchester.) 6 p.m.

**Nov. 19th.** MR. C. J. KING on Psychology of Good Lighting. (At the Heriot-Watt College, Chambers Street, Edinburgh.) 6.30 p.m.

## The "Darkness Into Daylight" Exhibition

The photograph reproduced below was taken during a recent visit by H.R.H. The Duke of Gloucester to the "Darkness into Daylight" Exhibition held at the Science Museum, South Kensington, to mark 100 years of research and achievement in electric lighting. The photograph shows His Royal Highness with Dr. J. N. Aldington (Director of Research of Siemens Electric Lamps and



Supplies, Ltd.) and Dr. H. Shaw, Director of the Science Museum, and is of particular interest as it was taken at the very instant in which Dr. Aldington was demonstrating synchronised flash discharge.

The microphone seen on top of the cabinet on the left actuated the trigger pulse of an S.F.2 flash tube. When Dr. Aldington clapped his hands the S.F.2 fired, producing a high speed flash of light synchronised with the camera shutter.

This exhibition, which has been open since April, had up to the end of August already attracted the amazing figure of over 332,000 visitors. It is due to close on September 30.

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## Obituary

### JOHN STEWART DOW, 1881-1948

It is with the deepest regret that we announce the death, on Thursday, August 12, after a very short illness, of Mr. J. S. Dow. Through his lifelong connection with the Illuminating Engineering Society Mr. Dow was known and loved by lighting engineers of all ages, and his passing will be mourned by all.

Born in 1881 John Stewart Dow passed through a course in electrical engineering at the City and Guilds of London Engineering College, and then spent some years on the staff of the college, later being engaged on research work on photometric problems.

His early association with Leon Gaster led in 1908 to the publication of *The Illuminating Engineer*, for which he acted as assistant editor. Even in those early days the bulk of the work was done by him, and in 1928 he became editor. The name of the journal was changed to *Light and Lighting* in 1936.

Mr. Dow was better known for his unbroken connection with the I.E.S. since its foundation in 1909, when he acted as hon. assistant secretary, becoming hon. secretary in 1928. It is hard, perhaps, to realise the difficulties with which the Society was faced in those early days, and the success of the Society has undoubtedly been due to J. S. D.'s enthusiasm, tact and administrative ability.

He suffered a great physical handicap which, thought tending to make him retire within himself, did not detract from his ability, as all who had the pleasure of serving on I.E.S. council and committees know. In 1946 he became President of the I.E.S., after which he continued to serve on the council. He was justifiably proud of his attendance at every meeting of the council during the 39 years from the first meeting in 1909. He was a Fellow of the Society and in 1942 was elected an honorary life member, an honour which was shared only by the late A. P. Trotter. At the I.E.S. Convention, held in London in 1946, the occasion was



John Stewart Dow.

taken, in view of his retirement from the office of hon. secretary, of making a suitable presentation to him, including an illuminated address.

With the development of the I.E.S. and the formation of centres and groups in the provinces the duties of hon. secretary to the I.E.S. were not inconsiderable, but in spite of this he found time to serve on a number of committees concerned with lighting, including the Departmental Committee on Factory Lighting, the Illumination Research Committee and the Lighting Committee of the Building Research Board. He also acted as hon. secretary of the Association of Public Lighting Engineers from 1931 to 1935.

He had a great fund of wisdom which was always at the disposal of the I.E.S. He was never perturbed and would never make a hasty decision and it is due to his careful thinking that the Society is so well placed to-day to carry on now that he is no longer at the helm. He had set the Society a very high standard but he was full of confidence in its future.

The Society has suffered a great loss and many of us have lost a great friend. He was well known in international lighting matters, and the news of his death will be a blow to lighting engineers in all parts of the world. The sympathy of his many friends will go to his relatives in their bereavement.

## Tributes to J. S. Dow

We publish below a number of letters of appreciation of Mr. J. S. Dow, which have been received from many of those who have been associated with him in his life's work. In addition to the following a number of other tributes have been received from I.E.S. members, friends and other bodies, and it is regretted that space does not permit the reproduction of all.

**DR. J. W. T. WALSH** (*President of the Illuminating Engineering Society*).

All who knew John Stewart Dow, and that is to say all members of the Illuminating Engineering Society and very many other illuminating engineers all over the world, cannot but feel it a great personal loss that he is no longer with us to inspire, encourage, and, if necessary, admonish in that way which seemed so peculiarly his own.

The magnitude of the loss which our Society has sustained can hardly be exaggerated. He was its co-founder, and for many years he was the moving spirit and sustainer of that which he had helped to create. It is a great source of satisfaction that he should have lived to complete his year of office as President.

In the international field Mr. Dow was a well-known figure, and the members of illuminating engineering societies in other countries will join with us in mourning yet another of those who pioneered in illumination when it was a subject little known outside a comparatively small band of enthusiasts.

His memory will always remain with everyone who knew, respected, and admired that self-effacing and lovable personality which meant so much to us all.

**H. C. WESTON** (*Hon. Secretary and Past-President of the I.E.S.*).

Only two years ago, when President of the I.E.S., it was my privilege to pay a verbal tribute to John Stewart Dow

on the eve of his retirement from the office of hon. secretary, which he held for nearly 20 years. The memory of this is still fresh in my mind, for the event was an exceptional one in a year that is memorable for other reasons, and Mr. Dow stood so high in my regard that it gave me particular pleasure to laud him.

But this was no valedictory eulogy, since he was to remain with us as President, and afterwards, I hoped, for many years as an elder statesman. That the time should have come so soon when I can only write of him instead of speaking to him in praise is a painful surprise. All too soon the Society has lost another of its outstanding members, and I a valued friend.

Nearly two-thirds of J. S. D.'s lifetime was given to the affairs of the Society, and of the Journal associated with it, and for more than this his interest and work was concerned with lighting. That he did in fact complete a year of office as President of the Society was a consummation he was fully entitled to expect, and Fate would have been perverse indeed had it cheated him of this. Yet it was typical of his selflessness that he did not expect it, and it was difficult to persuade him to accept nomination for this office.

Indeed, he was prevailed upon to do so only by the argument that it was naturally the wish of many that honour should be done to him in this way, and that they would be pained if this wish could not be fulfilled; and also by my agreement to his proposal to "see him through" by accepting office as Hon. Secretary during his Presidential year. To do him this service—if so it was—and thus to ensure that he took his proper place at the head of the Society for which he did so much, was the most practical way of paying my personal tribute to him then, and it was a genuine pleasure to be able to do this.

Besides his modesty, I would repeat what was said of him in the Address presented to him in 1946; he was sagacious, patient, and benign. With such a combination of personal qualities he could not fail to win the enduring loyalty of the staff who worked with him, nor to gain many friends among his fellow-officers and members of the Society. He was a facile writer, and the full and accurate records he made of

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council proceedings—usually from the most meagre notes—were proof of his excellent memory. He never missed a council meeting for any reason, and if, sometimes, even his patience was strained by unduly protracted disputations, he seldom betrayed it by more than a jocular reference (*sotto voce*) to "sea-lawyering," or by a "doodle" of similar import depicting a ship on a choppy sea! He was "a jolly good fellow."

SIR JOHN HERBERT PARSONS (*Past-President of the I.E.S.*).

The death of Mr. Dow, following so soon on that of Sir Clifford Paterson, removes two of those most influential in the advancement of lighting in England of recent years. Paterson by his scientific knowledge, stimulating energy, infectious enthusiasm, and outstanding capacity to direct research, has done more for the improvement of the means of illumination than anyone else. Dow, as the chief motive force through its career of the Illuminating Engineering Society, has done more than anyone else in England to advance the best interests of the Lighting Industry. The founder of the Society, Leon Gaster, had the excellent idea of enlisting all those interested in good lighting, not only professional illuminating engineers, but also architects, physiologists, and medical men. The remarkable success of the Society has been due to Dow's profound knowledge of the subject, his indefatigable perseverance, and administrative ability. Members of the Society do not need to be reminded of his imperturbability and his genial character. They have lost a leader and a faithful friend, who will not easily be replaced.

THE EARL OF MOUNT EDGECUMBE (*Past-President of the I.E.S.*).

For us older members the tragic death of J. S. Dow has severed one more of the links with the past and the Illuminating Engineering Society will never again seem quite the same to us. His loyalty to his old chief, his devotion to the cause he has so much at heart and his refusal to allow what to others might have been a crippling disability to interfere with his life work were an inspiration to us all. He will be terribly missed.

PERCY GOOD (*Director of the British Standards Institution, Past-President of the I.E.S.*).

For many years John Stewart Dow was an unassuming leading figure in the world of light. A contributor to, and a careful reporter of, technical progress in the field of illumination, he was to a large extent responsible for starting the movement which has led to the present-day recognition of the importance of light and its correct use.

Although Dow suffered a considerable physical handicap, which, though it did not daunt him, threw him back into himself, he was an excellent committee man and left his mark on everything he touched—it was a mark of quality. He went through life efficiently, making little noise, and one cannot help thinking that it would be a better world if there was more of such quiet efficiency.

Dow's devotion to the cause which he adopted quite early in his career, brought results which gave him a substantial measure of satisfaction, although many of his friends felt that he did not get full recognition of the services he rendered.

He took the rebuffs of a somewhat self-seeking world philosophically, but his was a sensitive nature and it was clear to his intimates that he suffered but without personal resentment.

A comparison of the technical development in the use of light and in the production and use of artificial light from the time he left college to the time of his passing can be taken as a measure of Dow's value.

The Illuminating Engineering Society might not have reached its present stage if there had not been others with more driving force than Dow possessed but it was Dow who steadfastly insisted that the Society was a scientific one and during all the years it was under his guidance he resented any effort which might have resulted in the Society becoming a propaganda one. The I.E.S. owes him much.

PROF. J. T. MACGREGOR-MORRIS (*Past-President of the I.E.S.*).

I am glad to have this opportunity of paying a tribute to the work of J. S. Dow throughout his long career in the

service of the Illuminating Engineering Society.

I met him first in the early days of the Illuminating Engineering Society in conjunction with its founder, Leon Gaster. Both men were convinced of the need for an impartial platform on which the various illuminants could be discussed primarily from the results they produced. Their characters were, however, widely different and, that being so, it speaks well of Dow's tact, that they were able, for many years, to work together for the one ideal right up to the time of Gaster's death in 1928. Tangible proof of this was shown by the joint authorship of the book "Modern Illuminants and Illuminating Engineering" in 1915 and their collaboration through many years in the growth of the Illuminating Engineering Society.

I was associated with Dow, Trotter and Edgcumbe in the early photometric tests initiated by the committee which ultimately became the National Illumination Committee of Great Britain. In the 1914-18 war it became important to determine the candle-power seconds output of various shell flares, and a special committee of the Illuminating Engineering Society was asked to undertake the work. Dow co-operated in this work with Trotter, Gaster, Clinton and myself.

He was fond of flowers. Once on coming into his office, which had been rearranged for one of the innumerable committee meetings of the I.E.S., I noticed in the centre of the table a group of sweet peas of almost exhibition size. On my remarking on them it turned out they were of his own growing!

He had watched over the Society from its infancy and leaves it singularly well equipped to carry on now that he has gone from us.

His mastery over his defect of hearing through the intelligent use of a hearing aid was splendid.

Outstanding characteristics were his unflagging interest in everything appertaining to illuminating engineering, and his unfailing courtesy to all and sundry.

**P. J. WALDRAM (Original Member).**

As a member of the Illuminating Engineering Society from its earliest days, I am indeed deeply sensible of the great loss which we have sustained by

the passing of one who has done so much for us all.

It is difficult, or impossible, to find words in which to express fitting appreciation of his many valuable qualities.

His fresh, skilful, scientific mind invariably brought new light upon every one of the innumerable problems of a new profession upon which he spoke or wrote; but our loss is more personal than scientific. First, as the intensely loyal assistant of Gaster and later on his own account, he not only aided the Society; to a large extent he was the Society.

Infinitely patient, invariably kind and always helpful, to know him was to love him.

We have suffered an immense loss and are left with an undying memory.

**W. J. JONES (Director of the Electric Lamp Manufacturers' Association, Past-President of the I.E.S.).**

Mr. Dow was a man of lovable character, enjoying the simple things of life, ever willing to help others and with a high sense of duty. He was quiet and unassuming, yet withal had a character of diverse ability. He was an able and forceful journalist, equally at home writing for the layman as for the technician, and copious in output.

Without his industry as a writer the journal, "The Illuminating Engineer," could not have survived. Having carried out some of the earlier work on visual capacities and light measurement and maintaining an alert mind on illuminating engineering, he had a sound and critical faculty appertaining to lighting matters.

Since the foundation of the Society, and particularly after the death of Leon Gaster, he became to all of us the embodiment of the Illuminating Engineering Society. He was proud of its achievements, and worked assiduously for its success.

Throughout the 35 years of my association with him, my outstanding impression was of one who gave unstintingly to the cause he so much loved.

**GUY CAMPBELL (Original Member).**

I should like to add my appreciation of the great services the late Mr. J. S. Dow rendered to the Art of Illumination

and the Illuminating Engineering Society. In the pioneering days of 1907 and onwards he was indefatigable in his efforts. It is not too much to say that without his efforts and continual help it is highly probable the Society would not have survived its early struggles. He kept the flag flying by his steady and persistent work in every direction. His calm judgment, courteous manner, courage and kindness were outstanding, and his name will always be remembered and honoured by all those who had the privilege of working with him.

**HOWARD LONG** (*Former Senior Vice-President and Past-Chairman of the Birmingham Centre of the I.E.S.*).

The Illuminating Engineering Society and Mr. Dow have been synonymous for so many years that it is difficult to think of one without the other. There surely is no parallel to his length of devoted service from the inception of the Society.

The writer had known Mr. Dow over a quarter of a century since joining the Society in 1923. A close association through many activities in the Society during this period has revealed a lovable character: always willing to listen with tolerance whilst applying a sobering influence on ideas and schemes of perhaps an over-progressive nature.

Thus Mr. Dow has left the Society established on a sure and sound foundation on a nation-wide scale. With a detailed and thorough knowledge of the early difficult years, his experience was applied in guiding the rapid development of the Centres during the war years. Years of experience at Council meetings and a remarkable retentive memory enabled him to produce detailed minutes from the most brief notes.

It is some satisfaction to know that Mr. Dow was able to look back on his year as President before passing on.

**PRESTON S. MILLAR** (*Chairman of the U.S.A. National Illumination Committee*).

It is saddening to learn of the death of a distinguished contributor to the advancement of an art in which one is interested. When the loss includes also a sterling character and affable personality, the regret is redoubled. The death

of Mr. J. S. Dow, following so closely upon that of Sir Clifford Paterson, is a blow to British organisation for improvement of lighting technique that is felt keenly by the many who knew them here in the United States. Our sympathy goes out to British confreres in their loss, in feeling which we share.

**SAMUEL G. HIBBEN** (*Director of the American I.E.S.*).

It is with a deep feeling of loss that I learn of the passing of a pioneer and leader in the lighting fraternity, J. S. Dow. His name was associated with the Illuminating Engineering Society for so many years that we all came to accept him as an integral and almost permanent part of that organisation.

I well remember on the occasion of earlier sojourns in London how cheerfully he guided and entertained the visitor, and how sincere was his interest in the future growth of lighting. However intense was his application to duty, he nevertheless found time to enjoy the beauties of Nature, to appreciate the values latent in international acquaintanceships and to preside at meetings with a scholarly and gentlemanly statesmanship.

These and many other qualities endeared him to those of us who regretted that our paths could not cross more frequently. He built well for the Illuminating Engineering Society, and his loss will be deeply felt by many.

**ALAN H. OWEN** (*Formerly Hon. Sec. of the I.E.S. Manchester Centre*).

The sad news of the passing of J. S. Dow has been received with deep regret in the Centres. There he was looked upon as the father of the Society, and his constant encouragement to Centre Secretaries and Chairmen always inspired greater effort.

The fellowship which is characteristic amongst members of the I.E.S.—even though they be competitors in business—was largely developed by the influence and character of Mr. Dow, whose charm was radiated to all, whether professor or apprentice. We from the Provinces,

who attended Sessional meetings in London long before Centres were established, will always remember his welcome.

Another characteristic of Mr. Dow was his wonderful calm in all situations. We especially remember that day in 1940 when he attended the annual meeting of the Manchester Centre. The serious expression on the faces of the small audience was due to the headlines in the evening papers. The Germans had broken through and reached the Channel ports. We all felt that our I.E.S. activities should be suspended, but Mr. Dow calmly proceeded to outline his ideas for the reconstruction of the Centre, and from that meeting dates the progress still maintained.

The same calm was evident some five months ago when at Twickenham, during the Irish match, Guest scored the try of the year. Everyone was wildly excited except Mr. Dow. His smile indicated his obvious pleasure, but he merely remarked that he thought it was a good effort. Mr. Dow, by the way, was an all-round sportsman. He was particularly fond of rugby football and hockey. As a hockey player he had a remarkable career, and retired only after reaching the age of 53.

#### A. CUNNINGTON (*Past-President of the I.E.S.*)

I like to remember J. S. D. on some of those occasions when his mind was far from illuminating engineering. He was fond of music, but rather shied at classical concerts, and would mildly scoff by quoting from one of the Bab Ballads—they are all "Scherzando ma non troppo—ppp." What he really liked was opera—perhaps the colour and motion on the stage were some compensation for the misfortune that prevented him from hearing the fine detail of the music. He loved all the great operatic airs, and occasionally on the morning after a performance he would rise from a tedious spell at the typewriter, stretch himself, and, in a manner somewhat disconcerting to the office staff, would stalk up and down the room, singing in an un-

expectedly loud voice one of the airs that had taken his fancy.

#### E. STROUD (*Past-President of the I.E.S.*)

I shall always remember J. S. Dow as one of the kindest and nicest men I have ever had the good fortune to know. He was quiet and unassuming, but with sound technical and scientific knowledge on many subjects which was always at the disposal of any of his very many callers.

His calm and confident manner would always tinge the most stormy aspect with a sunset hue, and over many years I have never heard him express any harsh feelings towards any man.

It will be difficult to visualise the Illuminating Engineering Society without our friend and counsellor which covered the whole of its existence. Mr. Dow and the society were one; so much so that his work, so freely given, was taken for granted as part of things that happen. However complicated the discussions or divergent the opinions, one could be sure that the resultant report would express the best views for the advancement of lighting knowledge.

My connection with J. S. Dow goes back some 36 years, when I had a small part in the testing and development of the Holophane Lumeter, which was designed by Dow and McKinney, as well as taking a part in night photography and street illumination tests, in which Mr. Dow was very interested.

Later years I met Mr. Dow even more frequently in consultation and committee meetings and in council, and he always conveyed the feeling of soundness, confidence, and trust, and a man to whom it was a privilege to be a friend.

He was very keen on outdoor sports and played hockey up to a few years before the war. He was also very keen on rugby football, and before the war and after I invariably went with him to Twickenham to the international rugby matches.

We have certainly lost an outstanding personality in the illuminating engineering movement, which was his life-work, and I am sure that his greatest wish would be for it to continue from strength to strength.

## Lighting in Museums and Art Galleries

(Summary of a paper presented by W. E. Rawson-Bottom at the recent meeting of the International Commission on Illumination in Paris)

### Museums

Most of the lighting schemes in museums were installed many years ago when the relationship between illumination and architecture was not given the same study that it is to-day. The amount of work done since the war has been restricted and has been mainly concerned with the provision of additional lighting for exhibition and feature displays. The amount of permanent improvements carried out is comparatively small, but the work which has been done has provided information which should prove of value.

The pressing need in practically all museums and art galleries is for more light which, apart from being essential to enable the exhibits to be seen to the best advantage, is now expected by a more discriminating public in view of the all-round improvement in other lighting fields.

The majority of the buildings to be dealt with are classical examples of the architecture of their time, and it is felt, therefore, that the modern applications of lighting science must be tempered by a certain restraint in order to avoid conflicting with the traditions that are associated with such buildings. The

ideal aim should be to design modern lighting which not only gives the additional illumination now being demanded, but which also harmonises with the surroundings or is so unobtrusive as to pass unnoticed by the visiting public. In the case of the fluorescent lamp it is an attempt to produce an effect without an apparent cause which should receive most consideration, for it is difficult to find a perfect combination between this type of light source and a fitting of classical style. For this reason, among others, tungsten lamps can still often be used with good results.

Each lighting problem must be treated according to its merits in order to decide the most advantageous type of light source to employ. Not only must each building be considered as a separate problem, but various parts of each individual building may require entirely different treatment. It must also be remembered that a good general illumination from as many points as possible must be provided so that the nature and position of the exhibits may be varied as required. If an attempt is made to cover a large area from fewer points of larger light output, there is always the possibility of the light being on the wrong side of an exhibit or of one specimen screening another. Even with good general lighting there are occasions when an exhibit may require direct illumination from a particular angle. The beauty of carvings, for instance, can only be revealed by appropriate blending of light and shade. Such cases are special and must be treated accordingly.

It will be appreciated from the above



Fig. 1. The Central Court of the Victoria and Albert Museum.  
Left—Old lighting. Right—New fluorescent lighting.

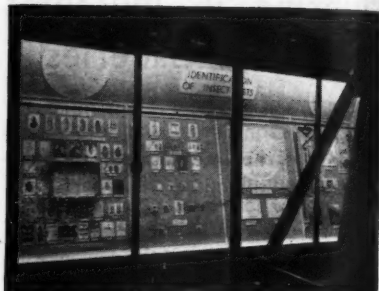
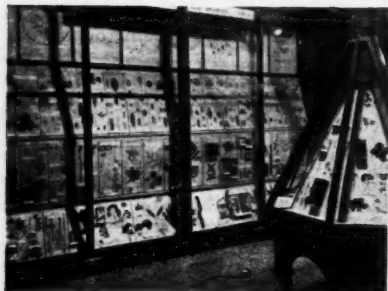


Fig. 2. Case lighting in the Natural History Museum.  
Left—The old tungsten lighting. Right—The new method with fluorescent lighting.

that no standardised scheme or design of lighting unit can be produced which would fulfil all the individual requirements of each museum; neither would it be desirable to become stereotyped in this branch of the science.

With the continuing increase in the luminous output of fluorescent lamps it is becoming more and more necessary to provide a suitable means of screening the tubes from direct view within normal viewing angles. Work has been proceeding to develop lighting units to provide this desirable feature. Lighting units, both pendant and direct mounting type, employing louvres of various types and designs, are being tried out, and the results so far obtained are encouraging.

The paper also gave details of a number of relighting schemes which had been carried out in the Victoria and Albert Museum, the Natural History Museum, and other places.

### Art Galleries

Artificial lighting in art galleries is a subject which, in the past, has received a great deal of attention and criticism. The fact that a room becomes different in appearance under natural and artificial light is accepted without question, but pictures are liable to change not only in tone but also in character under artificial light. Most pictures were visualised and executed in daylight, and very often the subtleties which the artist intended to convey are lost under artificial lighting. The ideal aim, therefore, should be to enable the pictures to be seen at night without upsetting the

balance and harmony of colour that the artist was so careful to create.

In the years prior to the war a fairly uniform intensity of about 3 to 5 lumens per sq. ft. over the picture carrying area of the walls was the best that could be expected. The modern fluorescent lamp, however, opens up a new field for research and development in art gallery lighting for not only is it more easily applicable when large vertical surfaces are to be illuminated, but eventually it may have a spectral emission more closely resembling that of daylight than at present.

As with all development work these improvements can only proceed gradually. Fluorescent lighting being still in a development stage, it would be unwise to embark on large installations until the practical results of experiments justify the expenditure. So far all the experimental work has been confined to the use of 80-watt hot cathode lamps, but in due course cold cathode tubes may be tried. The latter, by reason of their smaller diameter, would allow of more accurate optical control when used with an efficient specular reflector, and would help in obtaining the desired distribution over the picture area.

The first experimental installation of fluorescent lighting worthy of note was in connection with the "Cleaned Picture Exhibition" at the National Gallery, London, which was well received despite the improvisations employed.

The exhibition occupied six rooms of varying size with a total length of some 780 ft. run of picture-hanging area. Owing to the temporary nature of the exhibition it was necessary to suspend

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the lighting units in a manner which would cause no damage to the building, so it was decided to suspend a continuous rail supported from the roof members by wire cables. This arrangement allowed for varying heights and spacing of the reflector units as required, but the distance from the wall was fixed by the only suspension point available. The lighting units were specular reflectors of mirrored glass contained in metal cases, together with a few standard industrial reflectors, all for use with 5-ft. 80-watt fluorescent lamps.

The first trial was made with the reflectors at cornice level, 17 ft. from the floor. The reasons for choosing this height were to keep the reflectors out of normal view during daylight, to avoid specular reflection in tall, glazed pictures and also to cover the whole wall area from the cornice downwards. The offset distance of the reflectors from the walls was 6 ft. and the loading averaged 8 watts per foot run of wall.

The illumination obtained was an average of 10 lumens per sq. ft. at 10 ft., 6.5 lumens per sq. ft. at 5 ft. and 4.5 lumens per sq. ft. at 2 ft. from the floor. This intensity was insufficient to give the necessary brilliance to the colours in the pictures and, owing to

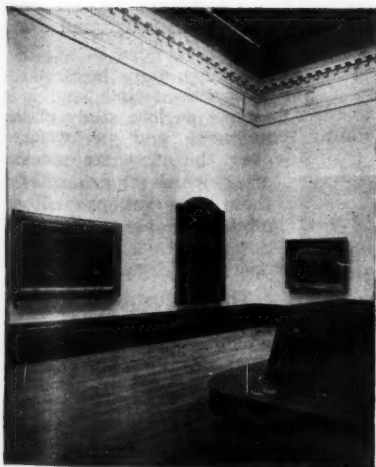


Fig. 3. The Exhibition of Cleaned Pictures at the National Gallery. The original test with fluorescent lighting fittings 17 ft. above the floor.

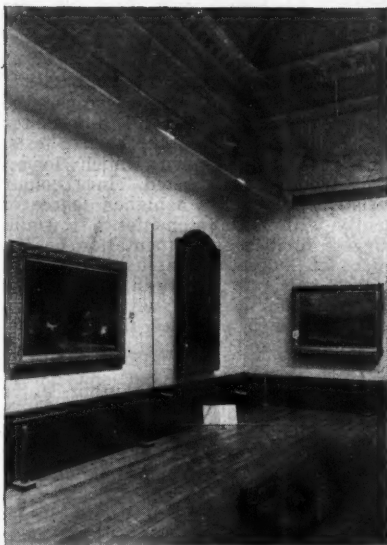


Fig. 4. The same view as Fig. 3, showing the effect of lowering the fittings to 11 ft. above the floor.

the acute angle of projection, a deep shadow was cast by some picture frames down the canvas.

The trial was continued by lowering a number of reflectors to 13 ft. 6 in., which obviated the frame shadows and raised the intensity to 26 lumens at 5 ft. from the floor. It was then decided to lower the reflectors a further 2 ft. 6 in. to compare results. Although the intensity at this lower level was not greatly increased, the pictures did appear to be more brilliant, which was probably due, apart from difference in intensity, to the difference in angle of incident light on the canvas.

Having reached a stage when the light distribution was thought satisfactory, the question of colour was then considered. For certain pictures the "daylight" lamps appeared to give the best effect, whilst for others "warm white" lamps were the more suitable. It was not possible with accurate specular reflectors to use two tubes of different colours in one reflector as neither would have been in focus, whilst to use a different colour in alternate reflectors would have given a patchy

result. In conjunction with the art experts a number of lamps of varying colours were tried. The one selected finally was a pale tint of "warm white."

At the higher intensities, with either daylight or warm white lamps, the colour rendering was found to be better than that observed in the earlier tests, when the intensity was much lower. This would be expected, since colour vision is brought to a higher degree of acuity with high intensities. It would suggest further experimentation on the effect of increasing intensities to still higher levels to ascertain, if possible, the optimum intensity with fluorescent lighting which provides the best discrimination and the least distortion of colours.

In his conclusions the author states that it has not yet been decided whether it is better to illuminate the picture-carrying area only, leaving the upper portion of the walls and remainder of room in shadow, or to allow the high intensity over the picture area to be

predominant over the general illumination. The latter would probably prevent an artificial appearance, whilst the former would focus the attention on the exhibits and avoid the illuminated architectural features of the room being reflected in glazed pictures if mounted at higher levels.

It is also stated that spaced reflector units are unsightly, and a continuous trough with a curved exterior formation would have a less disturbing daylight appearance. The continuous trough would also allow for high intensities to be provided and would be most appropriate if cold cathode tubes were used.

This experiment clearly indicated the all-round improvement to be expected by raising the intensity to not less than 25 lumens per sq. ft., and it may be found that a further improvement would be effected by raising the intensity above this figure. If high values are used the wall surface should have a low reflection factor to avoid a high brightness area surrounding the pictures.

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## Experimental Lighting in a Textile Mill

As the result of an investigation by the Indian Government into British practice in industrial lighting, a modern system of fluorescent lighting has been installed by Associated Electrical Industries (India) Ltd. in a textile mill in Bombay.

This installation, which has aroused

considerable interest in India, is to be used as a means of collecting data on the effect of improved lighting on output, working conditions, accidents, absenteeism, cleanliness of machines and the factory generally, and other figures in relation to costs.

This evidence can only be accumulated over a period of time, and it is intended to make a close study of the lighting equipment and performance over the next six months, after which the results of these observations will be made available for the benefit of all concerned with the operation of textile mills.

The illustration shows part of the Loom Shed, which is lit by 60 fittings each of two 80-watt fluorescent lamps. The other part of the shed is lit by tungsten lamps so that it is possible to compare the two systems side by side. The lighting equipment was supplied by the British Thomson-Houston Co., Ltd.



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## The Effects of Ultra-Violet Irradiation Combined With Artificial Light\*

The possible importance to public health of irradiation with artificially-produced ultra-violet light has received attention in this country, but in Scandinavia, where there is less sunshine than in Great Britain, the subject is of special interest. There has lately been published an account of an interesting investigation carried out in schools in Uppsala, Sweden, and it is with this investigation that the present article is concerned.

The important biological effects of sunlight, viz., the synthesis of vitamin D, the killing of airborne bacteria, and sunburn, are due to the ultra-violet part of the sun's spectrum, and particularly to the short-wave end of it. Hence, artificial light can never be a satisfactory substitute for natural daylight unless some ultra-violet irradiation is secured. Inside a room even natural daylight is not a substitute for outdoor sky and sunshine since most of the u.v. is absorbed by the window glass.

The development of gaseous - discharge and fluorescent lamps has given a large measure of control over the spectral composition of artificial light, including the u.v. component.

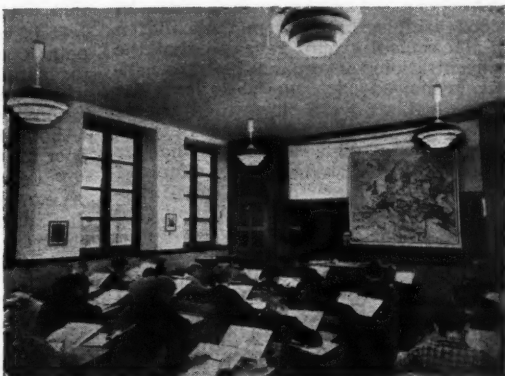
With these facts in mind, an investigation was made into the possible hygienic and physiological value of artificial illumination combined with ultra-violet irradiation.

The experiments were carried out over a period of one and a half years in one secondary school and one primary school in Uppsala. Two class-rooms in the secondary and one in the primary

school were each equipped with four u.v. illumination units. Other classrooms in the same schools were used as controls. Of a total of 220 children, 120 were exposed to u.v. radiation.

The source of u.v. illumination used was designed to give adequate lighting of a pleasing colour and at the same time provide a suitable dosage of u.v. The dosage was regulated, bearing in mind the three known effects on man, namely, reddening and pigmentation of the skin, inflammation of the cornea, and the effect of u.v. light in preventing rickets. Attention was also paid to the bactericidal effects.

The lamp chosen as the u.v. source was a medium-pressure mercury-arc lamp made by the Swedish Luma lamp factory, under the trade name LK 120. It consists of a small quartz tube into which are sealed electrodes of a tungsten



One of the experimental classrooms equipped for u.v. irradiation.

alloy, the whole being surrounded by a thin bulb of molybdenum glass, which allows selective transmission of u.v. light.

The mercury lamp, which had an energy input, with choke coil, of 120 watts, was mounted together with three 150-watt incandescent lamps in a specially-designed reflector. This reflector consisted of several concentric aluminium rings open upwards and downwards. The inner surfaces were chemically etched in order to give diffuse reflection through the visible and ultra-violet spectrum, whilst the outer sur-

\* An abstract of *Ultra-violet Irradiation With Artificial Illumination*, by Hans E. Ronge. (Institute of Physiology, University of Uppsala, Sweden, 1948).

Also published in *Acta Physiologica Scandinavica*, Supplementum 49, 1948.

faces were treated with a u.v. reflecting paint.

To supplement the action of the reflector in ensuring a reasonably uniform distribution of u.v. radiation, the walls and ceilings of the experimental classrooms were coated with the u.v.-reflecting paint. The paint, which was not washable, was made in two colours, white and yellow, the former being used on the ceilings and the latter on the walls. Barium sulphate, which has a good reflecting power for u.v. radiation, was used as the paint pigment, with casein solution as the binding medium.

### Analysis of Results

The investigation of the effects of u.v. light included studies of the children's mineral metabolism and of their physical fitness, as well as an analysis of records of their absenteeism, and measurements of the concentrations of air-borne bacteria.

Analysis of an extensive series of blood samples taken from the children of the control groups revealed that the concentrations of certain blood constituents showed a seasonal variation. The concentrations were lowest in winter and spring. This variation was not found in the irradiated children, and its absence was attributed to the effects of irradiation. These results are interpreted as indicating that the normal winter diet of the children was not sufficient to compensate for the lack of natural ultra-violet radiation.

The physical fitness tests showed that among the controls a tendency to a seasonal variation existed, the level of fitness falling in the winter, becoming still lower in the spring, and rising again during the summer and autumn. Fitness tests on the children in the irradiated group showed no such decline in winter. Indeed, fitness scores rose during the winter and spring. It is noted that the seasonal variation in fitness followed the variation found in the analysis of blood constituents, and it is suggested that the seasonal variation in fitness was due, at least in part, to depletion of vitamin D, due to lack of sunshine during the winter and spring, and that irradiation prevents this deficiency.

Measurements of the concentrations of air-borne bacteria were made in classrooms of both groups during the spring term. They were obtained by means of the highly efficient slit-sampler devised

by Bourdillon. In this instrument a sample of air is drawn through a carefully designed slit on to the surface of a revolving glass petri-dish containing a culture jelly. The air-borne organisms impinge on the jelly, and, after suitable incubation, the colonies formed may be counted. Results obtained by this method showed a reduction of 50 per cent. of total organisms in the irradiated classrooms as compared with the controls. The degree of disinfection produced was said to be equivalent to a ventilation rate of 30 air-changes per hour.

Records of absenteeism due to illness among the children indicated that in some cases u.v. irradiation caused a notable reduction of illness. The effect in this respect seemed to depend on the intensity of the irradiation and ceased when the ultra-violet sources began to age. The reduction in sickness-rate was attributed to the air-disinfection obtained.

It is concluded that from the standpoint of public health there are advantages in the general use of u.v. radiation which outweigh the high cost of installation and the high wattage required. (About 40 watts per square metre of floor area.)

Favourable places for the application of u.v. radiation appear to be schools, day nurseries, and other places where children are brought together, especially during the winter months. Its use in homes is limited by the high cost and wattage as well as the injurious effect of the u.v. radiations on plants and flowers. Prevention of over-dosage cannot be ensured in homes to the same degree as in public buildings. The use of u.v. irradiation for adults in industry, for instance, in underground factories, is probably justified mainly on bactericidal grounds, although low-pressure mercury vapour u.v. lamps would have a similar effect and would be more desirable on the grounds of economy.

The high wattage of general u.v. radiation at present may be reduced with the development of a fluorescent u.v. lamp which at the moment is still in the experimental stage. This appears to be an efficient and suitable source of u.v. radiation combined with illumination from fluorescence.

C. R. U.

## The American I.E.S. Gold Medal

### Presentation to Sir Clifford Paterston

As was announced in our August issue (p. 160) the actual presentation of the American I.E.S. Gold Medal, which for this year had been awarded to Sir Clifford Paterston, was made in the presence of a few guests to Lady Paterston by Mr. Preston S. Millar on July 22, only a few days before Sir Clifford's distinguished career was brought to a close.

In making the presentation Mr. Millar said how sorry he was that Sir Clifford was unable to accept the medal for himself, but that he felt it a great privilege to make the presentation to Lady Paterston on behalf of the President and Council of the Illuminating Engineering Society of America.

He went on to say that the I.E.S. of America, which was founded in 1906, now had a membership of 6,715 and had some 40 geographical sections and

chapters. Its objects were the advancement of the theory and practice of illuminating engineering and the dissemination of knowledge relating thereto, and it included in its membership a wide variety of specialists, including scientists, technologists, teachers, physicists, manufacturers of light sources and equipment, and many others.

The subject of illumination, he said, is like a jewel. It has many facets. To beholders who view it from different directions it presents somewhat different appearances. Seeking to deal with the subject in all its aspects the Society welcomed into membership such specialists as he had already mentioned, and, in fact, all specialists who could contribute to advancement in any phase of the subject.

In 1943 the I.E.S. made provision for presentation not more frequently than once a year of a medal to be awarded "for the purpose of giving recognition to meritorious achievement which has conspicuously furthered the profession, art, and knowledge of illuminating engineering."

The committee responsible for the selection of the 1948 medallist recom-

## The I.E.S. Medal

— awarded to —

### Sir Clifford Capland Paterston, Kt., O.B.E., D.Sc., F.R.S.

Scientist and Leader in the development of Illumination Equipment and Lighting Practice for almost half a century. Early Associate in the National Physical Laboratory; Guiding Genius and Director of Research Laboratories of The General Electric Company Ltd. since their inception.

President of the Illuminating Engineering Society (Great Britain), 1928; President Institution of Electrical Engineers, 1930-1931; President of the Institute of Physics, 1937-1938.

Honored in 1946 by Knighthood conferred in recognition of his many years of eminent Public service and his valuable contributions during World Wars I and II

Outstanding contributor to International Friendship and to collection and interchange of Scientific Information through leadership in organizing The International Commission on Illumination and in guiding its activities since 1913 as

Honorary Secretary and President

*By unanimous vote of the Council of the*  
**Illuminating Engineering Society**

New York, 12 February, 1948

*Frederick S. Millar*  
PRESIDENT

*Walter Sturrock*  
SECRETARY

The citation.



The American I.E.S. Gold Medal awarded to Sir Clifford Paterson.

mended unanimously, and the Society's Council approved unanimously, that the award be made to Sir Clifford Paterson. The award had occasioned widespread favourable comment among lighting people in the U.S.A.

Under normal circumstances, Mr. Millar continued, the medal would have been presented at the Society's Annual Technical Conference in September, but, this being impracticable, the Society had taken advantage of Mr. Millar's presence in England to make the presentation. Those who were privileged to know Lady Paterson, said Mr. Millar, felt that it was eminently fitting that she should receive the medal for conveyance to Sir Clifford.

Mr. Millar then read the citation and made the presentation of the medal.

Mr. J. M. Waldram (President-Elect of the I.E.S.), who is the senior research illuminating engineer at the research laboratories of the General Electric Company, Ltd., at Wembley, where he had served under Sir Clifford for many years, said how sorry they were that it had been impossible for the presentation to be made to Sir Clifford at a representative gathering of American and British illuminating engineers as had been originally planned. He said that if Sir Clifford had been able to reply he would undoubtedly have referred to the honour which the American Society have done not only to him, but, in choosing an Englishman to receive the award, to the whole lighting industry in this country. In their own country

our American colleagues had no lack of men fully qualified to receive the award; yet they had chosen to make it to an Englishman. Their decision, he said, would be a source of pride and satisfaction to all lighting men in this country, and he asked Mr. Millar to convey this appreciation to the Council and members of his Society.

Lady Paterson, in a letter to the President and Council of the Illuminating Engineering Society of America, expressed on behalf of Sir Clifford the great gratification he felt at the news that the I.E.S. Gold Medal for this year had been awarded to him. The honour thus accorded to him and to the work he had done for illuminating engineering meant a great deal to him and he had been very disappointed when it was obvious that he would be unable to attend the Paris Conference and receive the medal personally.

Lady Paterson added that now that Sir Clifford's work with the I.E.S. was over she was very glad to think that his life's work was to bring more and better light both in the physical and the spiritual sphere to what is, at present, so dark a world. His career was ending after an amazingly successful tour in Australia, where all agreed he had done good work, not only for his own company, but also for the learned societies he had been asked to represent. In spite of his increasing physical disability, he had carried this work through to the end. The letter concluded with Lady Paterson's grateful thanks on behalf of Sir Clifford.

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# The EDITOR Replies

The question whether fluorescent lighting is harmful to health or to the eyes arises from time to time, and it seems to do so not because any harmful effects have been convincingly shown to be due to lighting of this kind, but because of the spread of rumour of ill-effects. As fluorescent lighting has been in use in this country for nearly nine years, surely if it were harmful to health there has been time for this to be established beyond reasonable doubt, and in quite a large number of cases. Yet no such cases have been described in the medical periodicals, and at least one of these journals has on two occasions in the past three years published an answer to the question now mentioned, which discounts the idea that fluorescent lighting is inherently harmful in any way.

If those who listen to rumour would demand the same standard of proof of ill-effects that they expect to the contrary, we suspect that this question would be less often posed. One of the strangest complaints about fluorescent lighting we have heard is that it is "too hot." This one, at least, can be disposed of without difficulty.

It is sometimes asked why the I.E.S. recommended values of illumination differ from those of other bodies in other countries. The answer is that the discrepancy is due to the fact that different criteria are taken as basic for these recommendations.

Since the purpose of illumination is to enable us to see, and the ease and certainty with which we can do this

varies with the degree of illumination, it is evident enough that the values recommended will depend on the standard of seeing taken as the end in view.

The I.E.S. recommendations are based on achievement of a good "standard of seeing," but it is not claimed that they are the best possible recommendations. They have been arrived at after careful consideration of the results of scientific investigations, and of trends of practice which, at least in some measure, gauge the need of uses.

Of course, economic considerations cannot be entirely ignored in this matter. As Dr. Halbertsma pointed out, in his address to the Society last year, some countries may have to recommend values lower than our own because they cannot afford our standards at present. On the other hand, some countries may be able to afford standards which approach the optimum more nearly than do those which we recommend.

The use of colour in factories for the purpose of improving the visible environment of the workers, as well as the utilisation of light and the visibility of the work, continues to excite considerable interest. Some excellent colour schemes have been introduced by progressive factory managements who are well satisfied with the results achieved. Some writers on this subject seem to make rather heavy weather of it, and to overstress the pitfalls that may beset the path of those who contemplate introducing a colour scheme.

It is true that it is not difficult to make a good one, nor are the schemes proposed by colour "experts" always happy ones. But even the "best laid scheme" will fail to please someone.

The lighting of churches is a subject upon which very definite views are sometimes expressed. It has been said that, ideally, no old church should have electric lights at all, because their glare is too harsh for the delicate texture of an old building; and that candles are the best light of all or, failing that, oil lamps, though if electric lights must be used, there should be "as many bulbs as possible of the lowest power possible."

Lighting engineers are not likely to subscribe to this view, for there is no need for electric lighting to be glaring even if relatively high-power light sources are used, providing the installation is well planned. Nor does it appear that the traditional ecclesiastical gloom is adequate for revealing the "delicate texture of an old building."

## SITUATIONS VACANT

**STYLISING AND ARTISTIC DESIGNER** required by an E.L.M.A. Company, London area, for the development and design of all types of Lighting Fittings. Applicants must have had a wide experience, including preparation of production drawings and modern manufacturing methods. Salary according to experience and ability. Pension scheme in operation.—Box No. 584, c/o Dorland, 18, Regent-street, London, W.1.

**DESIGNER - DRAUGHTSMAN** required by an E.L.M.A. Company, London area, for development and design of Lighting Fittings, all types. Applicants must have had considerable experience in this class of work and possess originality and a good knowledge of production methods. Salary according to experience and ability. Good prospects. Pension scheme in operation.—Box No. 586, c/o Dorland, 18, Regent-street, London, W.1.

## Personal

Mr. R. O. Ackerley, manager of the Illuminating Engineering Dept. of the G.E.C., Ltd., and a past president of the I.E.S., has been appointed chairman of the Utilisation Section (formerly known as the Installations Section) of the Institution of Electrical Engineers for the session beginning on October 1.

Mr. Ackerley joined the G.E.C. in 1919 and spent five years on their staff in South Africa before being appointed manager of the company's Illuminating Engineering Dept. in London in 1931. He has contributed a number of papers on lighting matters both to the I.E.E. and the I.E.S.

## Errata

Our attention has been drawn by Mr. H. P. Walker to two errors which appeared on p. 138 of the July issue in connection with the account of the paper, entitled "Acrylic Plastics in Lighting," which he and Dr. W. E. Harper presented at the I.E.S. Summer Meeting at Harrogate.

In the account of Mr. Walker's reply to the discussion it is stated that he said that the figure of 70 deg. F. as that at which demoulding was likely to take place, had proved to be a safe one. This temperature should have been given as 70 deg. Centigrade.

The other error is in connection with the statement that there is a sharp rise in tensile strength at the higher temperature. This should have read, "a sharp rise in impact strength."

We apologise for these errors regarding important physical properties of the material under discussion.

## FOR SALE

**VENNER TIME SWITCHES.** Approx. 300 50-amp., type MSCS; and 75 ditto, type JCS, above being synchronous motor types, in almost new condition. Also approx. 300 50-amp., hand-wound (40-day) type C.S. and a quantity of 100-amp. "Oil-bath" switches, various types. — Kippax Bros., Boot-street, Burnley, Lancs.

## The Empire Stadium and Pool, Wembley

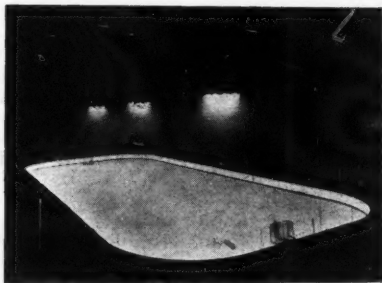
Wembley was the scene last month of the Olympic Games. Many of these sporting events, boxing, racing, table-tennis, and ice hockey, are held after dark, and present special problems for the lighting engineer.

The lighting of the greyhound and speedway racing track within the Stadium has recently been overhauled by the Metropolitan-Vickers Electrical Company, Ltd., in co-operation with the Stadium engineers, and special rectangular greyhound track reflectors with 1,500-watt filament lamps (two per pole), mounted 18 ft. above track level, have been installed.

Care was necessary to avoid "glare" conditions for the spectators, regardless of their position in the Stadium, and at the same time to ensure adequate coverage, especially at the bends.

The main stands are illuminated by a series of 500-watt and 750-watt totally enclosed prismatic reflectors, which provide a uniform level of illumination over the whole seating area, notwithstanding the fact that the tiers of seats rise at an angle of about 45 deg. Care had to be taken to ensure that the level of illumination in the stands was sufficient for ease of reading but at the same time was not too great to hinder quick eye adaptation when the stand lights are switched off for the races.

All the lighting units in the main stands are supplied with winch equip-



Lighting at the Empire Pool Ice Rink.

ment for raising and lowering during maintenance.

To provide lighting for the terraces in front of the stands, a system of 1,500-watt open type floodlights is installed high up at the front of the two stands. A series of similar open-type floodlights are mounted on poles at the top of the east and west terraces in order to provide adequate movement and safety lighting.

In the Empire Pool the main lighting comprises four banks of 15 concentrating type high-bay units mounted 42 ft. above floor level. In each bank of 15 fittings there is a mixture of 400-watt mercury discharge lamps and 1,000/1,500-watt filament lamps, providing lighting akin to natural daylight.

Additional special lighting is provided for the various functions which take place from time to time. The boxing ring is illuminated to a high level by 25 1,500-watt concentrating reflectors suspended from a square batten. The units are mounted 20 ft. above ring level, and a pelmet fitted around the framework restricts the light to the ring area.

Similarly, for the table tennis championships a canopy housing nine 1,500-watt lamps and six 400-watt mercury discharge lamps in deep dispersive reflectors is provided at a height of approximately 25 ft.

The lighting arrangements described were installed and engineered by the Stadium engineering staff, and these details are published by courtesy of Wembley Stadium, Ltd.



Lighting at Wembley Stadium.

## Floodlighting At Torquay

Thousands of holiday visitors to Torquay were able to spend the Olympic Yachting Week under somewhat favoured conditions as the Minister of Fuel and Power had given permission, on this special occasion, for the floodlighting along the Rock Walk to be switched on again.

The floodlighting apparatus was installed before the war, at the end of which it was completely overhauled by the Torquay Corporation in the hope that it could be brought into use again. Unfortunately the need for fuel economy prevented the immediate return to pre-war brilliance. On certain days of the Olympic Week, however, the Rock Walk and the slopes above were floodlit once again.



The equipment installed by the British Thomson-Houston Co. Ltd. in 1938 and comprising some 48 projectors using mercury vapour discharge, gas-filled projector, and filament lamps was used again to show up and enhance the natural attractions of Torquay.

The illustration shows the effect of the lighting from the bay.

## The Royal Photographic Society's Exhibition

The ninety-third Annual Exhibition of Photography arranged by the Royal Photographic Society opened at the Society's headquarters at 16, Princes Gate, London, S.W.7, on September 10.

Out of the 5,600 entries which were submitted some 700 were selected for exhibition so that it has again been necessary to divide the exhibition into two parts. The first part, which is now on view, will be open until Sunday, October 3, and deals with pictorial and colour photography. The other half of the exhibition will cover scientific, nature, record, and technical photography and will be open from Saturday, October 9, until Saturday, October 30.

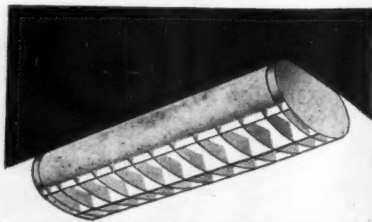
The Royal Photographic Society is the premier photographic society in the world. Founded in 1853, following the Great Exhibition of 1851, it now has a membership of over 6,000, a large proportion of whom are resident overseas. Its Associateship and Fellowship are distinctions much prized by photographers of all nations. Owing to the wide field of the Society's activities special groups have been formed to cover such subjects as pictorial, miniature camera, colour,

scientific and technical, kinematograph, and medical photography.

Admission to the exhibition is free. Tickets are required however for the showing of selected kinematograph films, which is to take place in the Lecture Theatre of the Science Museum at 7 p.m. on October 12. Tickets may be obtained from the secretary of the R.P.S., 16, Princes Gate, S.W.7.

## New Fluorescent Lighting Fittings

For commercial, decorative, or domestic lighting installations two new fittings, the "Drury" and the "Harrow," for use with 2-ft. fluorescent tubes have



been introduced by the Crompton Parkinson company. The "Drury" (illustrated above) is for use with two 20w. tubes and the "Harrow" with two 40w. tubes.

# MAZDA FLUORESCENT LAMPS



## Announcement...

From September 1st Mazda Fluorescent Lamps (MCF/U) in the following sizes will be available in "Natural" colour.

LENGTH	WATTS	DIAM.	CAP.	LIST PRICE	PUR. TAX	TOTAL
* 5 ft.	80	1 1/2"	BC	15/6	4/0	19/6
* 4 ft.	40	1 1/2"	Bi-Pin	14/0	3/8	17/8
† 2 ft.	40	1 1/2"	Bi-Pin	13/0	3/5	16/5
† 2 ft.	20	1 1/2"	Bi-Pin	12/6	3/3	15/9

\* Can also be supplied in "Daylight" and "Warm White" at above prices.

† Can also be supplied in "Warm White" at above prices.

From October 1st the undermentioned sizes in "Natural" and "Warm-White" colours become available.

LENGTH	WATTS	DIAM.	CAP.	LIST PRICE	PUR. TAX	TOTAL
3 ft.	30	1"	Bi-Pin	13/0	3/5	16/5
1 1/2 ft.	15	1"	Bi-Pin	11/6	3/0	14/6

A wide range of fittings for the 5 ft., 4 ft., and 2 ft. Mazda Fluorescent Lamps is available. Details of an attractive series of fittings for use with the 3 ft. and 1 1/2 ft. lamps will be announced later.

**BTH LIGHTING ADVISORY SERVICE:** Lighting Engineers attached to the above will be pleased to advise on the application of fluorescent lamps and to solve any lighting problems submitted to them. BTH Lighting Advisory Service, Bridle Path, Watford. Phone Watford 7701/8.

**MAZDA**  
LAMPS



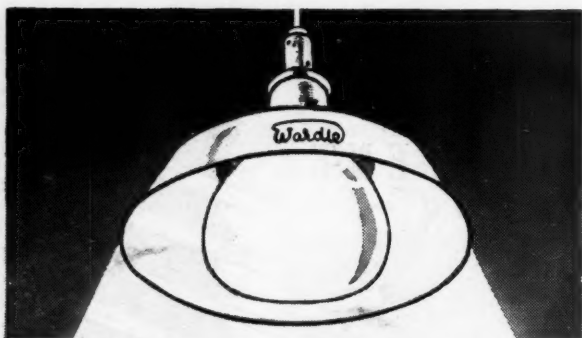
**MAZDALUX**  
FITTINGS

THE NATION'S LIGHT

M4192

The British Thomson-Houston Co. Ltd., Crown House, Aldwych, W.C.2





High efficiency light dispersal without glare and with minimum shadows. Reasonably good delivery offered.

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### Lighting in a Nottingham Church

The lighting scheme recently completed in St. Andrew's Church, Nottingham, incorporates G.E.C. floodlighting units with 200-watt pearl lamps. In the nave, shown in the illustration, 18 fittings are used mounted 30 ft. above the floor and located close to the wall on the east side of the main cross beams and directed eastwards across the nave.

In the north and south aisles four units are mounted on each side 18 ft. above floor level at the junction of the aisle ceiling and the nave arches. They are directed eastwards and towards the outer walls. Four fittings are used to illuminate the choir stalls and are located high up behind the chancel arch.

At pew level the average illumination is of the order of seven lumens/sq. ft., with

the low diversity factor of 0.75 to 1. The whole of the nave and aisle lighting is controlled by two dimmers, mechanically connected and located near the south entrance.



